

testimony has caused mental derangement too often to be read into the verdict. Society must some day use the knowledge acquired in psychiatric research in the same manner it now uses the knowledge of the engineer and economist for its protection and improvement.

Unfortunately, however, application of medical knowledge to social use is, in this period of our civilization, seriously interfered with by those devotees of eccentric thinking who form pseudoreligious healing cults. These peculiar individuals find their way into social uplift groups, jury panels, and even the judiciary itself. With their antimedical slant, it is almost impossible to obtain a verdict in accordance with the medical facts in any legal case where they act as jurors. Embodied in a group of individuals possessed of some education and with a certain economic strength, this sinister influence is more inimical to the development of a sound social system than all of our defectives, criminal or otherwise.

While social conditions have a definite bearing upon the development of mental disturbance, the real cause lies within the patient himself; and the psychiatrist, in his consideration of these external influences, must not be diverted from the study of the patient and his disease. The duty of the physician is to adjust the patient, insofar as that is possible, to his environment and not attempt to reorganize the environment to suit the patient. Social conditions are formed in ways not always clear to contemporary observers, and attempts to shape the course of social evolution by artificial means may be attended by disastrous results.

LEISURE AND ETHICS*

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IT is in all humility that I address you on this subject. I shall attempt to indicate what I feel is the spirit which should guide us in our conduct, in our ethics, and how this spirit may best be gleaned by the right *appreciation of art and of nature*.

It is with humility I speak as a fellow traveler who is still struggling along the pathway of experience, who has not traveled far, but who has just begun to see the light dimly shining through the veil of this mysterious life. I would call a halt and ask you to consider the spiritual side of life and work. I make no apology for dwelling on this aspect. As Robert Bridges says of Francis of Assisi: "His following in life and his fame thereafter confute the lower school of Ethick, which would teach that spiritual ideas are but dream-stuff in men."

We who have youth seem to ourselves immortal. "Life is indeed a strange gift and its privileges are most miraculous. Nor is it singular that when the splendid boon is first granted us, our gratitude, our admiration, and our delight should prevent us from reflecting on our nothingness, or from thinking it will ever be recalled. . . . Like a clown at a fair, we are full of amazement and rapture, and have no thoughts of going home, or that it will soon be night."

We cannot inculcate the highest traditions of our profession by work alone. "Moral respon-

sibility—Am I my brother's keeper?"—is the root and spring of purified humanity. This sublime postulate needs no apology, and we shall find neither the desire nor the strength for our task except by a full and frank recognition of that spiritual factor which Meredith so beautifully indicates in the lines:

"Our life is but a little holding, lent
To do a mighty labour, we are one
With heaven and the stars, when it is spent
To serve God's aim."

Life is but a combination of leisure and of work. Our conduct in our work is summarized for us in the Hippocratic Oath. Conduct is based upon character, and our character is affected more by the use of our leisure hours than by those spent at work. Into those leisure hours we must weave our interpretation of life, its mystery and its beauty, until it becomes the very fabric of our being. We may consider these leisure hours as an outlet from the more confining path of professional activity. I would suggest that in art and in nature you will find this outlet toward the better and fuller appreciation of life and the true tradition of our noble profession.

It is not in all of us to appreciate certain forms of art, but in at least one of its branches, whether it be literature, music or painting, we can find pleasure and inspiration, which in turn, almost unknowingly, will influence our ethical bearing and our outlook on our fellow men. Channing, in his "Essay on Milton," says of poets: "They carry the mind beyond and above the beaten, dusty, weary walks of ordinary life, lift it into a finer element and breathe into it a more profound and generous emotion." *Art is but the expression of man's joy in his work*. Let his joy imbue us with enthusiasm to acquire some familiarity with one of art's manifestations. Thus will we in great measure avert any narrowing influence in our increasingly concentrated and more specialized work.

Of *the realm of nature* there is but little that I can say. I should like to quote Dawson, one of our Edinburgh teachers, pathologist and philosopher. "Nature is a realm in which we must live alone, for no spirit can guide another spirit into her manifold mysteries and unceasing wonders. The voices that speak in sea and sky, in river and forest, in the majesty of the mountains and the dreamland of the plains, in flower and grass, are alike within the dominion of the soul. As we grow up and roam alone and the voices of nature speak to us, we learn something of the inner meaning and mystery of all that surrounds us; we come to recognize beauty where we had seen only color, to realize life where we had seen only form."

Thus we fill our leisure hours with beauty—garnered both from nature and from art and we come to reverence it, not for its sake alone, but for the hidden things that lie behind all loveliness—a reverence for all that is best in the world—whether in the beauty of earth, sea or sky, in the realm of art, or on the highroad of life where men struggle and suffer. Thus is our understanding deepened and we are the better

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fitted for the work of our choice. To carry on this work according to the highest ideals and ethical principles must be our aim. Without the spiritual side there can be no ethics, and medicine without ethics is unworthy of the name.

THE LURE OF MEDICAL HISTORY

ESSAYS ON THE HISTORY OF EMBRYOLOGY*

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SHORTLY before Malpighi's observations on the development of the chick were published, an epoch-making observation had been made by a Dutch microscopist, Antoni Leeuwenhoek. This man, who was called an "immortal dilettante" by Professor Becking, a young countryman of his, is usually given credit for the discovery of the spermatozoon. Although Leeuwenhoek may have been a dilettante, he nevertheless made many important discoveries with microscopes made by himself, but which were far superior to any others of the time and were made by the hundred, according to Stein.

THE SPERMATOZOÖN

It is regrettable that Leeuwenhoek's imagination, like Swammerdam's and Harvey's, led him sadly astray. It seems he reported to the Royal Society, to which he had sent so much that was startling and what commissions could not confirm because they had inferior microscopes, that he was able to identify male and female spermatozoa by inspection alone!

Spermatozoa were first seen in 1675 by Hamm, a student of Leeuwenhoek, who is otherwise unknown, in the semen of a man "who had cohabited with an unhealthy woman." It is to the credit of Leeuwenhoek that he quickly apprehended the significance of this discovery, and surmised that the moving, motile bodies which he called seminal filaments really were the male germs of animals. He looked for and found them in the testes of the dog and the rabbit, of birds, frogs, fish, and insects, and also in the tubes and uteri of dogs and rabbits. As Singer emphasized in "A Short History of Medicine," this was a very deserving and important accomplishment in embryology, and he did other things, as Stein and others showed so well. Leeuwenhoek also estimated the total number of spermatozoa in the gonads of some animals and stated that those of codfish contained more than ten times as many sperm as there were inhabitants on the earth at that time. Since there are over a hundred million spermatozoa in a single cubic centimeter of semen of some mammals, and since he thought that the population of the earth might be over thirteen

* This is the fourth paper of a series of essays on this subject. Previous papers were printed in this journal as follows: Part I in December California and Western Medicine, page 447; Part II in January California and Western Medicine, page 40; Part III in February California and Western Medicine, page 105.



Figure 3.

billions, it is evident that Leeuwenhoek approximated the truth fairly well.

Animalcules had long been known to occur in printer's ink, vinegar, and also in putrefying substances, hence it is easy to understand that the presence of similar organisms in human semen not only aroused skepticism and evoked surprise, but also caused disgust. Cole quotes Andry as saying in 1701 that, "If, after you have taken off one testicle [from a dog] and by the aid of the Microscope examined the Humour that comes out of the deferent vessels, you shall discover in it such a hideous number of little worms that you shall hardly be able to believe your own Eyes." But the indispensability of spermatozoa in procreation was not established experimentally until 1780, a century later, when Spallanzani performed the first experimental fertilization in toads, water salamanders and frogs, and proved that filtration of the semen destroys its fertilizing power and that an aura spermatica does not exist.

Whether Hartsoeker, who represented a flexed homunculus in the head of a spermatozoon, or Plantade, who signed himself Dalenpatius, and similarly represented a miniature human being in the extended posture, are to be taken seriously remains a question. Hartsoeker seems to have been known as unreliable and Plantade as a joker. Hartsoeker also stated that the tail of the spermatozoon becomes attached to the uterus and forms the umbilical cord. This idea may well have come